Chapter 3: Medical Care and Expenses

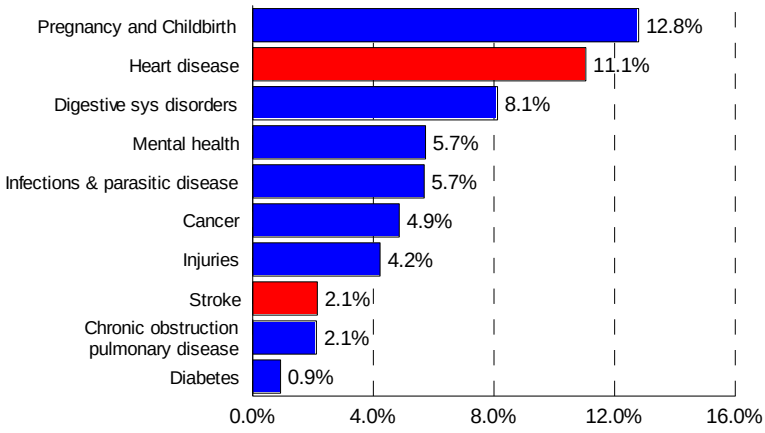
Introduction

Cardiovascular disease (CVD) mortality is declining in both Nebraska and the U.S[1,2]. Unfortunately, this is not paralleled by a similar decline in CVD morbidity[2]. The declines in CVD mortality are likely the result of a decrease in case fatality (less death among those with the disease), rather than improvements in CVD incidence and prevalence[3,4]. This indicates that the impact of CVD on the health care industry itself is likely remaining stable or in some cases may be worsening. While enormous (life saving) strides have been made in the treatment of CVD, the economic impact appears to be worsening[2]. Efforts to improve the economic impact of CVD must continue to find both cost-effective treatment and preventive support.

Cardiovascular disease continues to be the leading cause of (inpatient) hospitalization in both Nebraska and the nation[5,6]. However, when looking at the two major contributors to CVD, heart disease and stroke rank second and eighth respectively (Figure 1).

Nebraska medical care data for total CVD as well as specific cardiovascular diseases are presented within this chapter. These data include the number and rate of hospitalizations and medical visits, length of hospital stay, surgical procedures, hospital charges and payer, hospitalization outcomes (including death and follow-up care), medical prescriptions, and emergency medical services (EMS) response times.

Figure 1: Leading Causes of Hospitalization in Nebraska, 2001



Note: See methodology section of this report for cause specific ICD-9-CM codes
N=176,825 total hospitalizations in 2001
Note: 57.7% of all hospitalizations are for resons other than those listed above
Source: Nebraska Hospital Discharge Data

Medical care data throughout this chapter are presented in three sections; CVD and its two major subsections, heart disease and stroke. These data include Nebraska hospital discharge data (NHDD), Nebraska Medicaid claims data (NMCD), and Nebraska EMS response time data for cardiac events.

The NHDD includes inpatient (IP) and emergency department (ER) records for Nebraska residents treated in Nebraska acute care hospitals. The NHDD are not complete, meaning that records from some acute care hospitals in Nebraska are not available. Between 1996 and 2001, these data ranged from 82-87 percent complete for Nebraska residents treated in Nebraska hospitals. In addition, these data do not include hospitalizations where Nebraska residents receive care outside the State of Nebraska. As a result, these data represent only the minimum number of known hospitalizations. Unfortunately, the incompleteness of these data represents one of the gaps in Nebraska's health related data. Although these data have limitations, they do provide our best approximation of hospitalization in Nebraska.

The NMCD includes records on hospitalizations, outpatient, ER and physician office visits, and prescription medications for all Nebraska Medicaid enrollees. These data are complete and allow for some descriptive analysis (such as race and ethnicity) not available within the NHDD.

The Nebraska EMS response time data contain information on the time from dispatch to the arrival at the health care facility. The data presented within this chapter represent only response times for suspected cardiac events (including chest pain, myocardial infarction, and cardiac arrests). While these data do not represent stroke, it is our belief that response times for stroke may be slightly higher since stroke is a lower priority response than chest pain within many Nebraska communities.

Nationally, the number of (inpatient) hospitalizations for all conditions has been declining since the early 1980s[6]. These declines however, are attributed primarily to increases in ambulatory or outpatient (OP) surgery; made possible over the past 20 years by new surgical techniques and less invasive procedures[6]. Other treatment advances, including new drug therapies, have also contributed to fewer and shorter hospital stays[6]. Furthermore, cost-management controls and alternative forms of health care organization and payment have also contributed to shorter hospital stays[6]. This indicates that declines in inpatient care, while a step in the right direction, are not necessarily a refelection of less serious disease in Americans.

Many sub-populations within Nebraska have disproportionately high rates of CVD. Throughout this chapter, data are presented to highlight high-risk populations. Highlighting these populations is particularly important because they may be in greatest need of intervention that can improve their cardiovascular health, prevent further hospitalization, and lessen the economic impact. Some of the sub-populations receiving higher rates of medical care due to CVD include middle age and older adults, males, and Medicaid enrollees. Throughout this chapter, detailed information on these sub-populations and others is presented.

Similar to the nation, Nebraska has established a set of health goals and objectives for the year 2010[7]. The one objective established for medical care due to CVD is specific to hospitalization from congestive heart failure. Based on 2001 Nebraska hospital discharge data, substantial progress is needed if the objective is to be achieved by 2010. From the time of this report, there are only five years to successfully achieve this objective. Current hospitalization rates for congestive heart failure and the 2010 objectives for specific age categories are listed in Table 1.

Table 1: Progress Toward NE HP2010 Objectives for Congestive Heart Failure Hospitalization*

Age	NE Rate** 2001	NE 2010 Objective	% Reduction Necessary to achieve HP2010 Goals
Age 65-74 years	8.0	3.5	-56.3%
Age 75-84 years	16.6	8.4	-49.4%
Age 85 years and older	31.7	15.9	-49.8%

*Inpatient hospitalizaiton with congestive heart failure (ICD-9-CM code 428.0) listed as the primary discharge diagnosis

**Age-specific rate per 1,000 population

Sources: 1. Nebraska 2010 Health Goals and Objectives. May 2002.

2. Nebraska Hospital Discharge Data

Total Cardiovascular Disease (CVD) Hospitalization and Medical Care

Definition: CVD includes all diseases of the heart and blood vessel, which include coronary heart disease, stroke, congestive heart failure, hypertensive disease, and atherosclerosis. CVD is also commonly referred to as "diseases of the circulatory system."

Codes used to define CVD Hospitalization: ICD-9-CM codes 390-459

Total CVD Hospitalization Highlights

National Highlights

- CVD is the leading cause of hospitalization[8].
- 6.2 million hospitalizations due to CVD occurred in 2001, an increase of 27 percent since 1979[8].
- 71.1 million physician office visits due to CVD and 5.6 million outpatient department visits due to CVD occurred in 2001[9].
- In 2001, there were 4.2 million visits to the ER with a primary diagnosis of CVD[9].
- Direct health care costs resulting from CVD are estimated to be $226.7 billion in 2004[2].

Nebraska Hospitalization Highlights, 2001[5]

- Ant least 7,260 ER visits and 27,710 hospitalizations due to CVD occurred among Nebraska residents in Nebraska acute care hospitals.
- CVD caused or contributed to an estimated 2 in every 5 (or 43% of all) hospitalizations, making it the leading cause of hospitalization in Nebraska.
- The 27,710 hospitalizations due to CVD in 2001 occurred among 21,790 Nebraska residents.
- Nebraska acute care hospitals charged payers an estimated $517 million for hospitalizations and $9 million for ER visits for health care services with CVD listed as the primary reason for care.
- Among all payers of hospitalization due to CVD, Medicare received the highest proportion of charges (61%) followed by commercial insurance (35%) and Medicaid (3%).
- An estimated 36,090 cardiovascular operations and procedures were performed on an estimated 16,260 Nebraska residents.
- About 1 in every 24 hospitalizations due to CVD (4.1%) resulted in death prior to discharge while an additional 2 in every 10 (20.2%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Nebraska Medicaid Highlights, 2001[10]

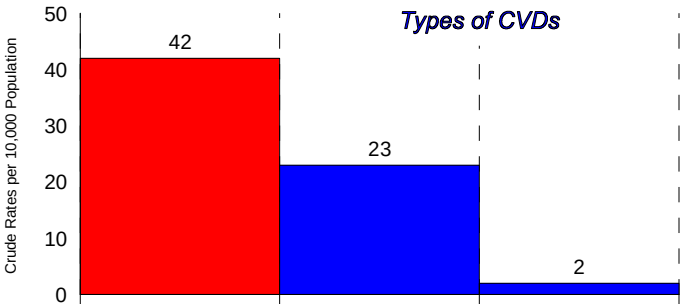
- 3,305 hospitalizations and 137,113 medical visits (including OP, ER, and physician office visits) due to CVD occurred among 23,863 of Nebraska's approximately 200,000 Medicaid enrollees.
- Among Nebraska Medicaid enrollees, about 1 in every 19 hospitalizations due to CVD (5.3%) resulted in death prior to discharge, while 1 in every 4 (20%) resulted in discharge to an intermediate care, short-term care, or other type of facility for follow-up care.
- Medicaid paid $96.8 million for medical care due to CVD and $17.8 million for CVD related drug prescriptions for a total of $114.6 million in 2001.
- In 2001, over 10 percent of Medicaid's costs for medical care and prescriptions were due to CVD
- It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year (assuming those added were similar to the current enrollees), Medicaid will pay $5.9 million (in 2001 dollars) for medical care and prescriptions for CVD.

Medical Care due to CVD among all Nebraska Residents[5]

Number and rates for ER visits due to CVD

Cardiovascular disease is a major contributor of emergency department (ER) visits among Nebraska residents. In 2001, an estimated 7,260 ER visits due to CVD occurred among Nebraska residents in Nebraska acute care hospitals. The crude (or actual) rate for CVD in 2001 was estimated at 42 ER visits per 10,000 population. Trend analysis in ER visits due to CVD (based on age-adjusted rates) is not possible due to dramatic changes, over time, in the completeness of the ER data.

Figure 2: Estimated Rates for Nebraska ER Visits Due to CVD*, 2001



	Total CVD	Heart Disease	Stroke
ER Visit Rate**	42	23	2
Number of ER Visits*	7,260	3,906	328

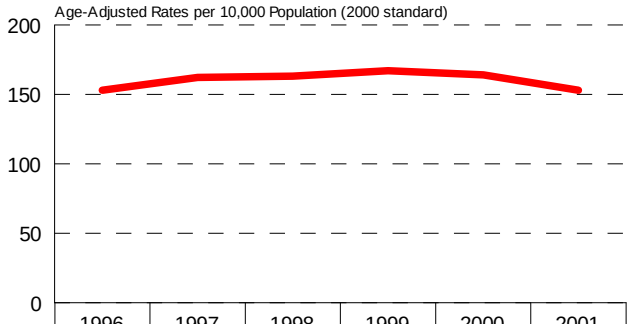
*Includes primary diagnosis codes only; specific ICD-9-CM codes are available in the Methodology Section of this report
**Crude rate per 10,000 population; the crude rate is the actual rate in the population, not adjusted to a standard age distribution
Note: these data are under-estimates because they are approximately 76% complete for 2001
Source: Nebraska Hospital Discharge Data

Number and rates for hospitalization due to CVD

Cardiovascular disease is the leading cause of hospitalization among Nebraska residents treated in Nebraska acute care hospitals. In 2001, CVD contributed directly to an estimated 27,710 hospitalizations among an estimated 21,790 Nebraska residents.

In addition to being a direct cause of hospitalization, CVD contributes indirectly to a large number of hospitalizations resulting from other conditions. In 2001, CVD was listed as a contributing factor in 48,120 hospitalizations. This indicates that CVD caused or contributed to an estimated 2 in every 5 hospitalizations (43%) in 2001.

Figure 3: Trends in Estimated Nebraska Hospitalization Due to CVD*, 1996-2001



	1996	1997	1998	1999	2000	2001
Hospitalization Rate**	153	162	163	167	164	153
Number of Hospitalizations*	26,630	28,180	28,690	29,560	29,590	27,710

*Includes ICD-9-CM Codes 390-459 listed as the primary diagnosis
**Age-adjusted rate per 10,000 popualtion (2000 U.S. standard population).
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Estimated hospitalization rates due to CVD (age-adjusted) increased slightly between 1996 and 1999 before declining between 1999 and 2001 (Figure 2). In 2001, the crude (or actual) hospitalization rate was estimated at 161 hospitalizations per 10,000 Nebraska residents.

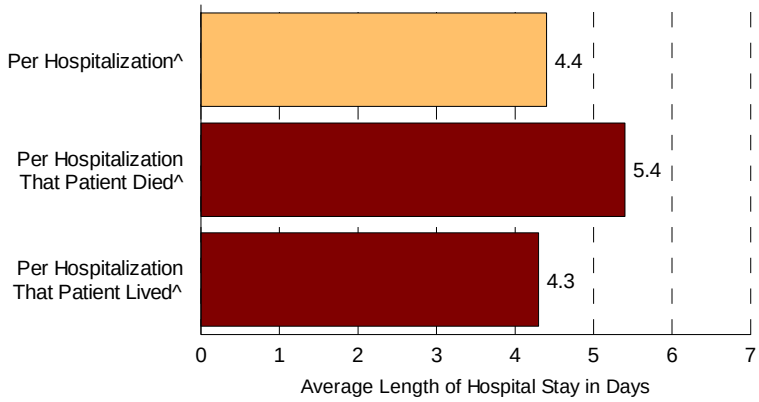
Length of hospitalization due to CVD

Cardiovascular disease contributes to a large number of days spent in Nebraska acute care hospitals. In 2001, Nebraska residents spent an estimated 121,660 days in the hospital from CVD, for an average stay of 4.4 days per hospitalization (Figure 4).

Among patients that are hospitalized for CVD, those that die during hospitalization average longer hospital stays than those that are discharged alive (Figure 4). In 2001, the average length of stay for CVD patients when they died during hospitalization was 5.4 days compared to 4.3 days when they were discharged alive.

The total number of days spent in the hospital due to CVD is declining. Between 1996 and 2001, the estimated length of stay per hospitalization declined from 4.8 to 4.4 days. While this decrease is encouraging, further studies are needed to explain its reasons.

Figure 4: Estimated Length of Stay for CVD Hospitalizations in Nebraska*, 2001

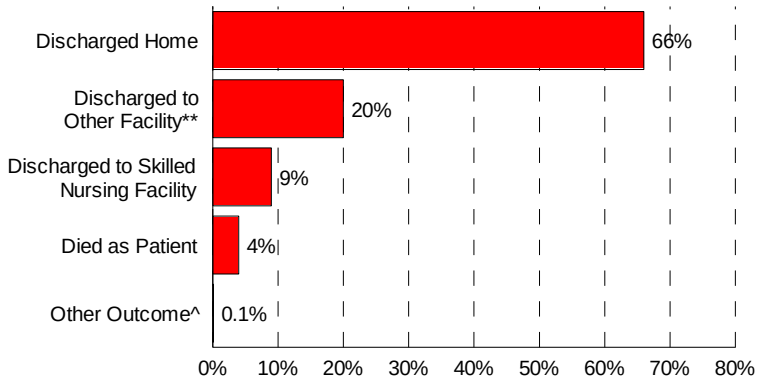


*Includes ICD-9-CM Codes 390-459,
^Hospitalization stay is based on the average stay per hospitalization (independent of the number of patients)
N=27,712 total hospitalizations due to CVD in 2001
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Hospitalization Outcome due to CVD

Many hospitalizations due to CVD result in a discharge outcome other than home or self-care (Figure 5). This indicates that additional costs (both direct and indirect) and reduced quality of life are likely to occur for many patients after they are discharged from acute care hospitals. In 2001, about 1 in every 24 hospitalizations due to CVD (4.1%) resulted in death prior to discharge. Furthermore, about 1 in every 11 hospitalizations due to CVD (9.2%) resulted in discharge to a skilled nursing home while 1 in every 5 (20.2%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Figure 5: Hospitalization Outcomes Due to CVD in Nebraska*, 2001



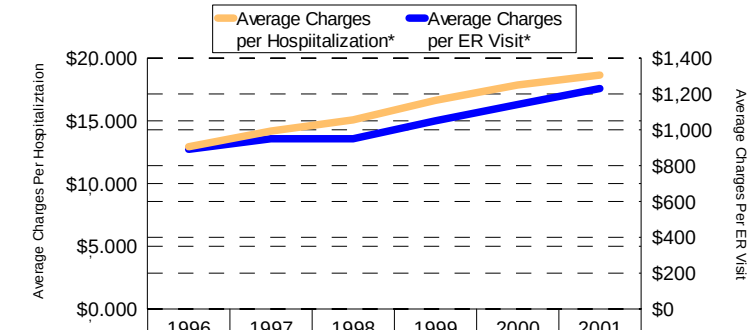
*Includes ICD-9-CM Codes 390-459
**Includes intermediate care, short-term care, or other type of facility for follow-up care
^Includes those that left against medical advice or had an unknown discharge
N=27,712 total hospitalizations due to CVD in 2001
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Hospitalization Charges due to CVD

While the Nebraska hospital discharge database captures hospital charges, it does not have information on the actual reimbursement that hospitals get paid for services rendered on their premises. Nonetheless, hospital charges were used as a proxy to reflect (at least one component of) the direct economic burden due to CVD within Nebraska.

Direct medical care expenses for CVD in Nebraska are extraordinary and appear to be increasing (Figure 6). In 2001, Nebraska acute care hospitals charged payers an estimated $517 million for hospitalizations due to CVD and an additional $9 million for ER visits, a dramatic increase from the $344 million and $4.9 million in charges in 1996 respectively. In 2001, the average estimated charge for a hospitalization due to CVD was $18,650, a 44 percent increase from the $12,920 per hospitalization in 1996.

Figure 6: Trends in Estimated Charges (in thousands) for Hospitalization and ER Visits Due to CVD* in Nebraska, 1996-2001



	1996	1997	1998	1999	2000	2001
Average Charges per Hospiitalization*	$12.920	$14.180	$15.060	$16.620	$17.840	$18.650
Average Charges per ER Visit*	$890	$950	$950	$1,050	$1,140	$1,230

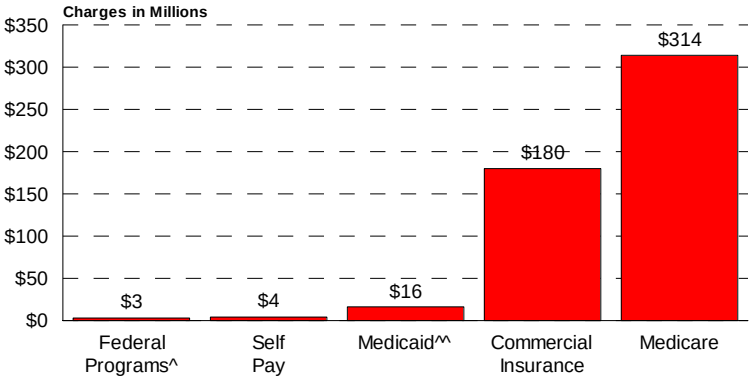
*Includes ICD-9-CM Codes 390-459
Note: hospitalization and ER visit costs are estimates because they are based on hospitalization data that ranges from 82-87% complete and ER visit data that rranges from 75-80% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Payer of Hospitalization Charges due to CVD

Medicare receives the largest proportion of all charges resulting from hospitalizations due to CVD (Figure 7). In 2001, Medicare was charged an estimated $314 million for hospitalizations due to CVD, accounting for approximately $3 of every $5 billed. Medicare was followed by commercial insurance, Medicaid, self-pay, and other federal programs respectively.

Trends in the average charge per hospitalization due to CVD are increasing among each of the payers, except federal programs independent of Medicare and Medicaid (Table 2). Medicaid and commercial insurance receive the highest charges per hospitalization.

Figure 7: Estimated Charges (in millions) for Hospitalization Due to CVD* by Payer, 2001



*Includes ICD-9-CM Codes 390-459, hospitalization charges are based on the average charge per hospitalization (independent of the number of patients) per payer
^Includes federal programs other than Medicare and Medicaid
^^Actual costs paid by Medicaid are available within this chapter, presented under the Medicaid hospitalization data
N=27,712 total hospitalizations due to CVD in 2001
Note: these costs are estimates because they ranges from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Table 2: Trends in Estimated Charges per Hospitalization due to CVD by Payer*, 1996-2001

	Year						
Payer	1996	1997	1998	1999	2000	2001	% Increase 1996-2001
Commercial Insurance	$14,800	$15,700	$16,600	$18,700	$20,300	$22,300	51%^
Self Pay	$11,700	$11,900	$13,500	$13,300	$15,900	$15,200	30%^
Medicaid	$12,800	$16,500	$15,600	$20,600	$23,900	$23,900	87%^
Medicare	$12,300	$13,600	$14,500	$15,700	$16,800	$16,900	37%^
Federal Programs	$20,100	$15,000	$15,800	$26,500	$24,700	$16,200	-

*ICD-9-CM Codes 390-459, hospitalization charges are based on the average charge per hospitalization (independent of the number of patients) per payer

^Increase significant at the 0.05 level

Note: these costs are estimates because they are based on data that range from 82-87% complete for any one year between 1996-2001

Source: Nebraska Hospital Discharge Data

Operations and Procedures for CVD

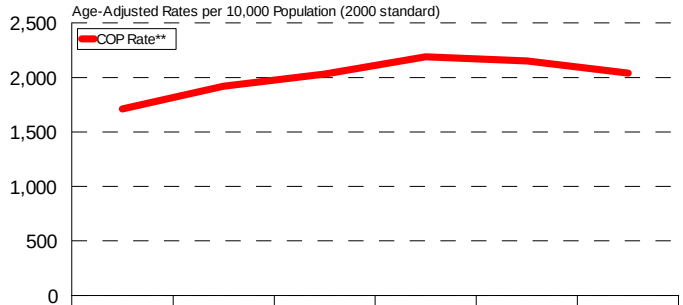
The role of medical intervention to treat CVD has increased significantly in recent years. In 2001, an estimated 6.2 million cardiovascular operations and procedures (COPs) were performed in the United States, a five fold increase since 1979[2].

It is estimated that in 2001, 36,090 COPs were performed on 16,260 Nebraska residents during 19,250 hospitalizations. This represents an average of 1.9 COPs per hospitalization and 2.2 COPs per patient.

Inpatient COPs in Nebraska appear to have increased since the mid-1990s (Figure 8). The estimated inpatient (age-adjusted) rate and number for COPs performed on Nebraska residents increased 28 percent and 31 percent respectively between 1996 and 1999 before leveling off and slightly declining.

There are a variety of different interventions available to treat CVD. In 2001, the most common inpatient COPs used to treat NE residents for CVD were diagnostic cardiac catheterization and angioplasty

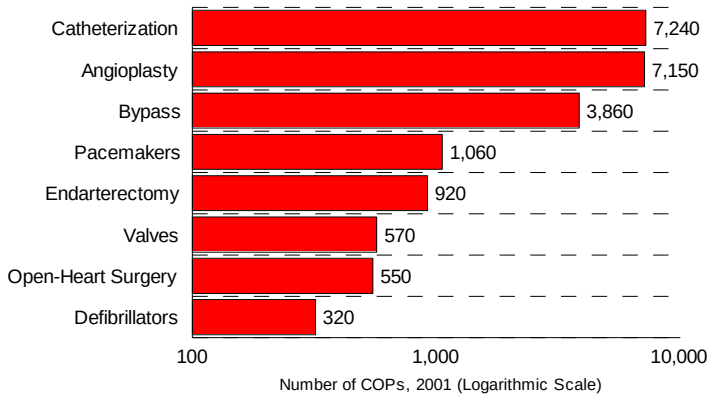
Figure 8: Estimated Trends in Inpatient Cardiovascular Operations and Procedures Performed on Nebraska residents*, 1996-2001



	1996	1997	1998	1999	2000	2001
COP Rate**	1,710	1,920	2,030	2,190	2,150	2,040
Number of COPs	28,500	32,380	34,470	37,410	37,700	36,090

*Includes ICD-9-CM Procedure Codes 35-39
**Age-adjusted rate per 10,000 population (2000 U.S. Standard population)
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001.
Also, these data do not include procedures performed as outpatients or in ER or other nonhospitalized setting.
Source: Nebraska Hospital Discharge Data

Figure 9: Estimated Number of Inpatient Cardiovascular Operations and Procedures Performed on Nebraska Residents by Type*, 2001



*Includes ICD-9-CM Procedure Codes 35-39; codes for specific procedures can be found within the methodology sectior
N=36,090 total cardiovascular operations and procedures in 2001
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

respectively ; accounting for 2 in every 5 (40%) inpatient COPs performed (Figure 9).

Of the COPs performed between 1996 and 2001 on Nebraska residents in Nebraska acute care hospitals, the greatest increases occurred in the use of stenting (a type of angioplasty) and implantable defibrillators (Table 3). Between 1996 and 2001, the age-adjusted rate and number of stenting procedures increased 160 percent and 180 percent respectively while the age-adjusted rate and number of implantable defibrillator procedures increased 160 percent and 175 percent respectively.

Table 3: Estimated Numbers and Rates for Cardiovascular Operations and Procedures Performed on Nebraska Residents in Nebraska Acute Care Hospitals, 2001

CVD Related Procedure (ICD-9-CM Codes)	Estimated Number of Procedures (N)	Procedure Rate*	% Change in Procedure Rate from 1996-2001^	Estimated Number of Hospitalizations that had a Procedure (N)	Hospitalization Rate for the Procedure*	% Change in Hospitalization Rate for the Procedure from 1996-2001^	Avgerage number of Procedures per Hospitalization
All CVD Procedures (35-39)	36,090	203.8	19.3%	19,250	108.6	21.5%	1.87
Angioplasty (36.0)	7,150	40.6	82.8%	3,770	21.4	46.7%	1.90
PTCA (36.01, 36.02, 36.05)[a]	3,830	21.8	46.0%	3,750	21.3	48.3%	1.02
Stenting (36.06)	3,310	18.8	159.8%	3,272	18.6	163.6%	1.01
Cardiac Revascularization (Bypass) (36.1-36.3)	3,860	21.9	4.0%^^	2,252	12.4	1.7%^^	1.71
Diagnostic Cardiac Catheterizations (37.2)	7,240	41.2	6.9%	6,970	39.6	8.0%	1.04
Endarterectomy (38.12)	920	5.1	-13.1%	910	5.1	-11.8%^^	1.01
Implantable Defibrillators (37.94-37.99)	320	1.8	160.0%	300	1.7	147.8%	1.07
Open-Heart Surgery[b]	550	3.2	56.4%	470	2.7	54.9%	1.17
Pacemakers (37.8)[c]	1,060	5.6	30.3%	1,050	5.6	31.2%	1.01
Valves (35.1, 35.2, 35.99)[d]	570	3.2	19.6%	520	2.9	20.2%	1.10

*age-adjusted rate per 10,000 population (2000 U.S. standard population)

^rate in 1996 is significantly different from the rate in 2001 at the .05 level unless noted by ^^ indicating a non-significant difference

a. Does not include procedures in the outpatient or nonhospitalized setting, thus may excludes some cardiac catheterizations and PTCAs.

b. includes valves, bypass and 92,000 "other" open-heart procedures (codes 35 [less 35.1-35.2, 35.4, 35.96, 35.99]; 36 [less 36.0-36.1]; 37.1, 37.3-37.5)

c. There are aditional insertions, revisions, and replacements of pacemaker leads, including those associated with temporary (external) pacemakers.

d. Open-heart valvuloplasty without replacement; replacement of heart valve; other operations on heart valves

Note: these data are estimates because they are based on data that range from 82-87% complete for any one year between 1996 and 2001

Sources: All data are from the Nebraska Hospital Discharge Data; codes and definitions are from the: American Heart Association. Heart Disease and Stroke Statistics – 2004 Update. Dallas, Tex.: American Heart Association; 2003.

Populations at High Risk for Hospitalization due to CVD

Within Nebraska there are a variety of subpopulations at particularly high risk for CVD. To eliminate these disparities, it is important that these populations are targeted for primary and secondary intervention efforts that will help to prevent, to more effectively treat, and to reduce the overall costs of hospitalization due to CVD. The Nebraska hospital discharge data does not contain information on race, ethnicity, education, or income. Thus, it is possible that some populations, not identified within this subsection, may be at equal or greater risk for hospitalization.

Middle-age adults

While Nebraska residents aged 65 and older are at much higher risk for hospitalization due to CVD, a large number of hospitalizations occur among residents under 65 years of age. In 2001, an estimated 8,000 hospitalizations due to CVD occurred among an estimated 6,500 Nebraska residents under 65 years of age. The number of middle aged Nebraska residents hospitalized due to CVD appears to be increasing. Between 1996-1998 and 1999-2001 the number of Nebraska residents, aged 45-64 years, that were hospitalized due to CVD increased 8 percent. Furthermore, of the more than 36,000 COPs performed on Nebraska residents in 2001, 43 percent, or about 15,400 occurred among residents under 65 years of age.

Males

Nebraska males are at greater risk than females for hospitalization due to CVD (Table 3). In 2001, males were an estimated 1.5 times more likely than females to receive hospital care due to CVD in a Nebraska acute care hospital. Furthermore, slightly more males than females were hospitalized due to CVD in 2001, an estimated 11,390 and 10,400 respectively.

Nebraska males are also more likely than Nebraska females to receive a COP. In 2001, the estimated age-adjusted procedure rate for males was 1.8 times higher than the procedure rate for females, 151 and 267 procedures respectively per 10,000 population. Males received an estimated 6,480 more COPs than did females in 2001.

Table 4: Estimated Hospitalization due to CVD by Age and Gender*, 2001

	Male		Female		
Age	Number Hospitalizations	Hospitalization Rate**	Number Hospitalizations	Hospitalization Rate**	Relative Risk M:F
All Ages	14,520	188	13,190	125	1.5^
45-64	4,120	226	2,540	135	1.7^
65+	9,590	1,017	10,110	698	1.5^

*ICD-9-CM Codes 390-459, data represent the total number of hospitalizations (independent of the number of patients)

**age-adjusted rate per 10,000 population

^relative risk significant at the 0.05 level

Note: these data are estimates because they are based on data that range from 82-87% complete for any one year between 1996 and 2001

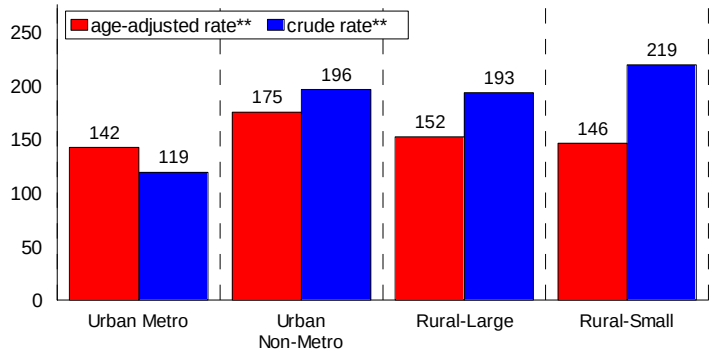
Source: Nebraska Hospital Discharge Data

Urban/Rural

In 2001, the rate of hospitalization due to CVD was an estimated 19 percent higher in urban non-metropolitan counties than all other counties ($p<.05$) (Figure 10). Also, residents of urban Nebraska counties are more likely than residents of rural Nebraska counties to receive a COP. In 2001, based on the estimated (age-adjusted) rate for COPs, Nebraska residents in urban-metropolitan counties were 38 percent more likely than residents in rural-small counties to receive a COP within a Nebraska acute care hospital (Figure 11).

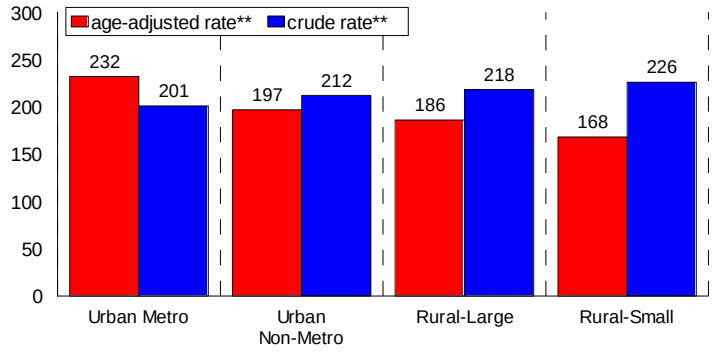
In contrast to the differences observed through age-adjusted hospitalization rates, crude rates indicate that a larger proportion of Nebraska residents in rural counties, compared to urban counties, receive inpatient hospital care and COPs for CVD (due to a larger percentage of older adults within rural counties) (Figures 10,11). While crude rates are not particularly useful for comparing risk among different populations, they are particularly useful for identifying the rate of actual hospitalization that occurs within a population. Knowing this information allows the health care system to be better prepared to deal with hospital care resulting from CVD.

Figure 10: Estimated Hospitalization Rates for CVD* by Urban/Rural, 2001



*Includes ICD-9-CM Codes 390-459
**Rates per 10,000 population
***See methodology for county classification criteria
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Figure 11: Estimated Cardiovascular Operation and Procedure Rates* for Nebraska Residents by Urban/Rural, 2001



*Includes ICD-9-CM Codes 35-39
**Rates per 10,000 population
***See methodology for county classification criteria
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Medical Care due to CVD among Nebraska Medicaid Enrollees[10]

Nebraska Medicaid claims data (NMCD) contain information on inpatient (IP) hospitalizations, outpatient (OP), emergency department (ER) and physician office visits, and prescription drugs.

Number and Rates for Hospitalization and Medical Visits due to CVD

Cardiovascular disease is a major reason for medical care within the Nebraska Medicaid population (Table 5). In 2001, 23,863 Nebraska Medicaid enrollees (or approximately 12% of all enrollees) received medical care or consultation due to CVD. These individuals accounted for 140,418 medical encounters (indicating hospitalization, OP, ER, or physician office visits) in which CVD was listed as the primary reason for care. The crude (or actual) rate in 2001 for medical encounters due to CVD among Nebraska Medicaid enrollees was 7.2 encounters per 10 enrollees.

Even though Nebraska's Medicaid population is young (compared to Nebraska's population) CVD is still a major contributor to hospitalization among these individuals. In 2001, CVD contributed directly to 3,305 hospitalizations among 2,511 Nebraska Medicaid enrollees for a crude (or actual) rate of 170 hospitalizations due to CVD per 10,000 enrollees.

In addition to directly causing hospitalization among Nebraska Medicaid enrollees, CVD contributes indirectly to a large number of hospitalizations resulting from other conditions. In 2001, CVD was listed as a contributing factor in 7,012 hospitalizations. This indicates that, among Nebraska Medicaid enrollees in 2001, CVD caused or contributed to greater than 1 in every 4 hospitalizations (27%).

Table 5: Medical Care due to CVD among Nebraska Medicaid Enrollees*, 2001

	Hospitalizations**		Total Medical Encounters***	
Statistics	CVD was the primary cause of hospitalization+	CVD caused or contributed to hospitalization++	CVD was the primary cause of the encounter+	CVD caused or contributed to the encounter++
Number of hospitalizations/encounters	3,305	10,317	140,418	199,778
% of all hospitalizations/encounters	8.7%	27.3%	4.0%	5.7%
Number of enrollees	2,511	7,042	23,863	28,885
% of all enrollees that were hospitalized/had a medical encounter	9.7%	27.1%	11.0%	13.3%
Crude rate^	170	532	7236	10295
Age-adjusted rate^^	349	1,076	12873	17988

*ICD-9-CM Codes 390-459

**Includes IP hospitalizations; due to the selection of specific billing codes during analysis, these data may be underrepresented

***Includes hospitalizations, OP, ER, and physician office visits

+A CVD code was listed as the first discharge diagnosis

++A CVD code was listed among any of the diagnosis codes (primary or secondary)

^Crude rate per 10,000 population

^^Age-adjusted rate per 10,000 population (2000 U.S. standard)

Source: Nebraska Medicaid Claims Data

Nebraska Medicaid enrollees appear at much higher risk than all Nebraska residents for hospitalization due to CVD. In 2001, the hospitalization rate for Nebraska Medicaid enrollees was estimated at 349 hospitalizations per 10,000 enrollees compared to an estimated rate of 153 hospitalizations per 10,000 Nebraska residents (age-adjusted)[58].

Length of Hospitalization due to CVD

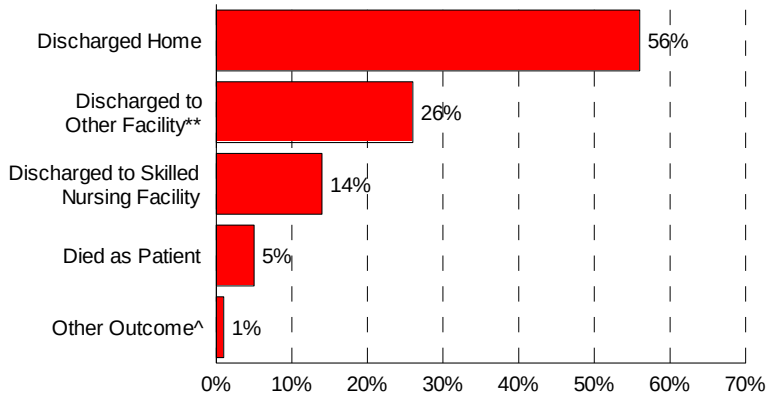
Cardiovascular disease contributes to a large number of days spent in the hospital among Nebraska Medicaid enrollees. In 2001, Nebraska Medicaid enrollees spent about 16,700 days in the hospital (as an IP) due to CVD, for an average of 5.1 days per hospitalization.

Nebraska Medicaid enrollees appear to have longer hospital stays due to CVD than do all Nebraska residents. In 2001, Nebraska Medicaid enrollees averaged 5.1 days per hospitalization due to CVD while all Nebraska residents averaged 4.4 days[58].

Outcomes of Hospitalizations due to CVD

Additional costs (both direct and indirect) and reduced quality of life are likely to occur within many Nebraska Medicaid enrollees after they are discharged from acute care hospitals due to CVD (Figure 12). In 2001, approximately 5 percent of all hospitalizations due to CVD resulted in death during hospitalization. In addition, 2 in every 5 enrollees were discharged after hospitalization to a skilled nursing home or other facility for follow-up care.

Figure 12: Outcomes of Hospitalizations due to CVD Among Nebraska Medicaid Enrollees*, 2001



*Includes ICD-9-CM Codes 390-459
**Includes intermediate care, short-term care, or other type of facility for follow-up care
^Includes those that left against medical advice or had an unknown discharge
N=3,305 total hospitalizations due to CVD in 2001
Source: Nebraska Medicaid Claims Data

Nebraska Medicaid enrollees appear more likely than Nebraska residents to be discharged for additional care beyond their CVD hospitalization. In 2001, 38 percent of Medicaid enrollees, compared to an estimated 29 percent of Nebraska residents, were discharged for follow-up care (to a skilled nursing, intermediate, short-term, or other facility for follow-up care). This difference is believed to be significant even though the NHDD are not complete.

Frequency of Prescriptions for CVD Drugs

Among Nebraska Medicaid enrollees, CVD-related drugs (those drugs used to treat CVD or a related risk factor) are a major component of all Medicaid drug prescriptions. In 2001, 1 in every 10 drug prescriptions filled by Nebraska Medicaid enrollees was for a CVD-related drug. Cardiovascular disease-related drug prescriptions were filled by 33,664 Nebraska Medicaid enrollees (or approximately 17% of all enrollees) in 2001.

Costs of Medical Care and Prescriptions for CVD

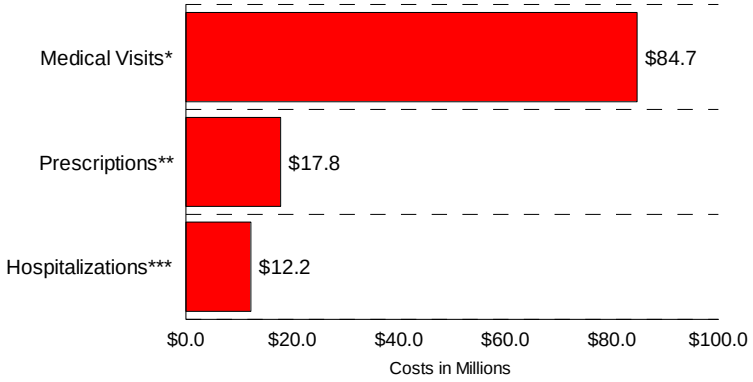
Unlike the NHDD, the NMCD capture the paid costs of hospitalization and care. As a result, the actual economic burden of CVD within the Nebraska Medicaid population is attainable. The following data represent what Medicaid actually paid for medical care and prescriptions for CVD in Nebraska.

For Nebraska Medicaid enrollees, Medicaid paid $96.8 million for medical care due to CVD and $17.8 million for CVD-related drug prescriptions for a total of $114.6 million in 2001 (Figure 13). Cardiovascular disease accounted for more than 10 percent of all medical care and prescription costs by Nebraska Medicaid enrollees in 2001. During calendar year 2001, the State of Nebraska paid 39.9 percent of the costs from Medicaid claims, while the remainder (60.1%) was paid by the federal government. This indicates that Nebraska paid (through tax-payer supported general funds) approximately $45.7 million for medical care and prescriptions due to CVD in 2001.

Adding new enrollees to Medicaid is costly for Nebraska (if those added were similar to the current enrollees). It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year, Medicaid will pay $5.9 million (in 2001 dollars) for medical care and prescriptions for CVD.

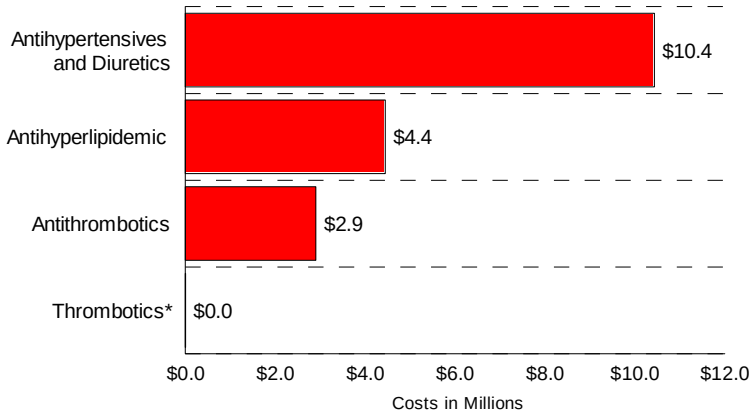
Medical visit costs (including OP, ER, and physician office visits) due to CVD are substantially higher than hospitalization costs due to CVD among Nebraska Medicaid enrollees (Figure 13). In 2001, hospitalizations due to CVD among Nebraska Medicaid enrollees accounted for $12.2 million while medical visits accounted for $84.7 million. On average, each hospitalization due to CVD cost nearly $3,700 while each medical visit cost approximately $620. Hospitalizations among Nebraska Medicaid enrollees that result in death from CVD prior to discharge incur greater expense than hospitalizations where enrollees are discharged alive.

Figure 13: Costs of Medical Care and Prescriptions for CVD Among Nebraska Medicaid Enrollees, 2001



*Cost incured during an OP, ER, or Physician Office Visit with ICD-9-CM codes 390-459 listed as the primary diagnosis
**Cost for CVD related drug prescriptions (that were filled) from the following drug classes: antithrombotics, Thrombotics, Antihypertensives and Diuretics, Not Specified Cardiac, and Antihyperlipidemic
***Cost incured during an IP hospitalization with ICD-9-CM codes 390-459 listed as the primary diagnosis
Source: Nebraska Medicaid Claims Data

Figure 14: Costs for CVD Related Drug Prescriptions (in millions) Among Nebraska Medicaid Enrollees by Drug Class*, 2001



*Costs for thrombotic drug prescriptions was $1,256 in 2001
N=33,664 Nebraska Medicaid enrollees received a drug prescription for CVD in 2001
Source: Nebraska Medicaid Claims Data

Cardiovascular-related drug prescriptions for Nebraska Medicaid enrollees are costly (Figure 14). In 2001, Medicaid paid approximately $17.8 million for CVD-related drug prescriptions among Nebraska Medicaid enrollees. Of the CVD-related drugs prescribed in 2001, antihypertensive and diuretic drugs (primarily used to treat high blood pressure) accounted for 59 percent of all CVD-related drug prescription costs for Nebraska Medicaid enrollees.

Medicaid coverage is important for low income residents in Nebraska. However, the medical care and prescription costs for Medicaid coverage place enormous strain on both the Nebraska and U.S. economy. Through the addition of preventive supports for CVD and its associated risk factors, it is possible that Medicaid could serve more residents without increasing costs.

Medicaid Populations at Highest Risk for Medical Care and Prescriptions due to CVD

While Nebraska Medicaid enrollees collectively are at greater risk than other Nebraska residents to receive hospitalizations due to CVD, there are disparities in medical care among Medicaid enrollees. Differences within these populations represent those beyond socioeconomic status (since enrollees in Medicaid are somewhat homogeneous with respect to income and education). It is important that these populations are targeted for primary and secondary intervention efforts that will help to prevent CVD, to treat CVD more effectively, and to reduce the overall costs of medical care due to CVD within the Nebraska Medicaid system.

Gender

Male Medicaid enrollees are at higher risk than female Medicaid enrollees to receive medical care due to CVD. In 2001, males were 16 percent more likely than females enrolled in Medicaid to have a medical encounter due to CVD (Table 6). However, because there are more females enrolled in Medicaid in Nebraska, females accounted for more than twice as many medical encounters than did males in 2001, 97,728 to 43,140 respectively (Table 6).

Table 6: Medical Care due to CVD Among Nebraska Medicaid Enrollees by Gender and Age*, 2001

	Male		Female		
	Number	Rate+	Number	Rate+	Relative Risk M:F++
Hospitalizations**					
All Ages	1,183	419	2,122	313	1.34^
45-64	474	962	568	718	1.34^
65+	530	1,167	1,396	1,008	1.16^
Medical Encounters***					
All Ages	43,140	14,207	97,278	12,238	1.16^
45-64	13,440	27,267	19,279	24,354	1.12^
65+	22,903	50,408	67,630	48,822	1.03^

*ICD-9-CM Codes 390-459
**Includes IP hospitalizations, may be underrepresented due to the selection of specific billing codes during analysis
***Includes hospitalizations, OP, ER, and physician office visits
+Age-adjusted rate per 10,000 population (2000 U.S. standard population)
++Relative risk represents the male to female rate ratio
^Male to female relative risk significant at the 0.05 level
Source: Nebraska Medicaid Claims Data

Residents under 65 years of Age

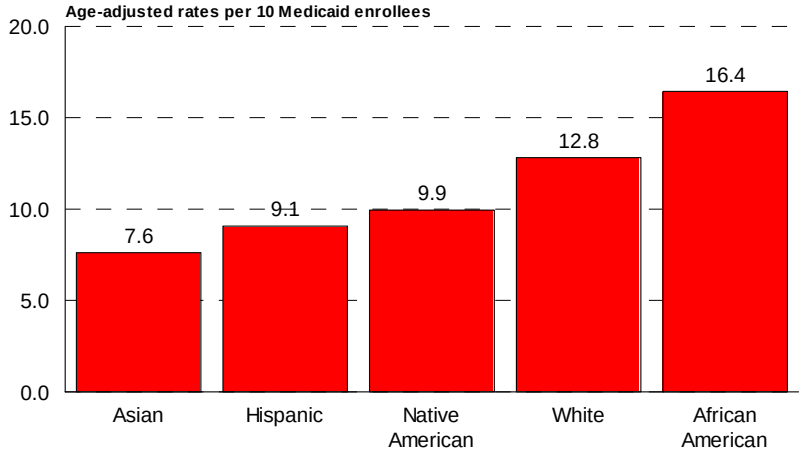
Compared to all Nebraska residents, Nebraska Medicaid enrollees appear to be at much higher risk for premature CVD. In 2001, Nebraska Medicaid enrollees aged 45-64 were hospitalized due to CVD at a rate of 811 hospitalizations per 10,000 enrollees (age-adjusted). In contrast, all Nebraska residents aged 45-64 were hospitalized due to CVD at an estimated rate of 179 hospitalizations per 10,000 residents (age-adjusted).

In 2001, 49,885 medical encounters due to CVD occurred among Nebraska Medicaid enrollees under 65, of which 1,379 were for (inpatient) hospitalization. Furthermore, 17,094 Nebraska Medicaid enrollees under 65 filled a CVD-related drug prescription in 2001.

Race/Ethnicity

African Americans enrolled in Nebraska's Medicaid system are more likely than all other racial and ethnic populations to receive medical care due to CVD (Figure 15). Compared to other races/ethnicities, African American Medicaid enrollees in Nebraska have the highest medical encounter rate for CVD, two times higher than the rate for Asians when controlling for differences in age.

Figure 15: Medical Encounter^ Rates for CVD* Among Nebraska Medicaid Enrollees by Race/Ethnicity, 2001

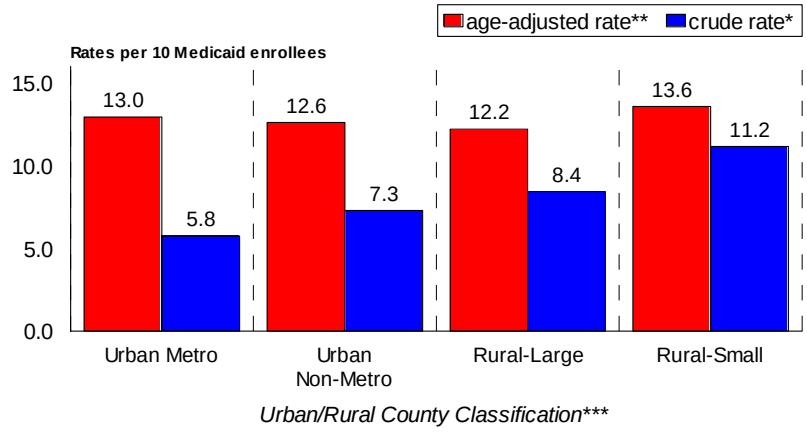


*Includes ICD-9-CM Codes 390-459, age-adjusted rates per 10 Medicaid enrollees (2000 U.S. standard population)
^Medical encounters include hospitalizations and OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Urban/Rural

When controlling for age (through age-adjustment), the medical encounter rates for CVD among Nebraska Medicaid enrollees do not differ by urban vs. rural residence (Figure 16). However, (based on crude rates) a larger proportion of Medicaid enrollees in rural counties, compared to urban counties, receive medical care due to CVD (primarily due to a larger older adult population in rural counties) (Figure 16). While crude rates should not be used to compare risk between different populations, they do provide information on the actual rate of care, thus allowing the health care system to be better prepared to deal with CVD.

Figure 16: Medical Encounter^ Rates for CVD* Among Nebraska Medicaid Enrollees by Urban/Rural, 2001



*Includes ICD-9-CM Codes 390-459, rates per 10 Medicaid enrollees
**age-adjusted rates per 10 Medicaid enrollees (2000 U.S. standard population)
***See methodology for further detail on urban/rural classifications
^Medical encounters include hospitalizations and OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Heart Disease Hospitalization and Medical Care

Definition: Heart disease is a form of cardiovascular disease; it includes all diseases of the heart, which includes acute rheumatic fever and chronic rheumatic heart disease, hypertensive heart disease, hypertensive heart and renal disease, coronary heart disease, congestive heart failure, as well as other forms of heart disease

Codes used to define heart disease: ICD-9-CM codes 390-398, 402, 404, 410-429

Heart Disease Hospitalization Highlights

National Highlights

- Between 1979 and 2001, the number of Americans that were hospitalized in short-stay hospitals with (a primary diagnosis of) coronary heart disease increased 27 percent[8].
- Nearly 2.1 million hospitalizations due to coronary heart disease occurred in 2001[2].
- The number of medical operations and procedures performed to treat heart disease has increased dramatically over the past 20 to 30 years[2].
- Direct health care costs resulting from all heart diseases are expected to top $130 billion in 2004[2].

Nebraska Hospitalization Highlights, 2001[5] *See pages 66-68 for detailed tables and figures.*

- At least 3,910 ER visits and 19,540 hospitalizations due to heart disease occurred among Nebraska residents in Nebraska acute care hospitals.
- Heart disease was the second leading cause of hospitalization, second only to pregnancy and childbirth.
- The 19,540 hospitalizations due to heart disease occurred among 15,330 Nebraska residents, indicating that many Nebraska residents were hospitalized multiple times for heart disease.
- Coronary heart disease accounted for an estimated 9,860 hospitalizations (about half of all heart disease hospitalizations) while heart failure accounted for an estimated 4,030 hospitalizations.
- The estimated trend in heart disease hospitalization rates (age-adjusted), between 1996 and 2001, appears somewhat curvilinear, increasing slightly from 1996-1999 before declining slightly from 1999-2001.
- In 2001, Nebraska acute care hospitals charged payers an estimated $398 million for hospitalizations and $6.2 million for ER visits for health care services with heart disease listed as the primary reason for care.
- Among all payers of hospitalization due to heart disease in 2001, Medicare received the highest proportion of charges (66%) followed by commercial insurance (31%) and Medicaid (2%).
- The average charges per hospitalization due to heart disease steadily increased between 1996-2001, increasing from $14,300 and $20,360 per hospitalization for a 42 percent overall increase.
- About 1 in every 27 hospitalizations due to heart disease (3.8%) resulted in death prior to discharge while an additional 1 in every 5 (19.9%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Nebraska Medicaid Highlights, 2001[10] *See pages 69-71 for detailed tables and figures.*

- 2,208 hospitalizations and 63,973 medical visits (including OP, ER, and physician office visits) due to heart disease occurred among 11,818 of Nebraska's approximately 200,000 Medicaid enrollees
- The age-adjusted rate (per 10,000 population) for hospitalization due to heart disease appears much higher among Medicaid enrollees (234) compared to all Nebraska residents (estimated at 108).
- Among Nebraska Medicaid enrollees, about 1 in every 17 hospitalizations due to heart disease (5.8%) resulted in death prior to discharge, while an additional 1 in every 4 (22.9%) resulted in discharge to an intermediate care, short-term care, or other type of facility for follow-up care.
- Medicaid paid $41.1 million for medical care due to heart disease along with millions of additional dollars for heart disease-related drug prescriptions
- In 2001, heart disease accounted for 4.5 percent of all medical encounter costs (including hospitalization, OP, ER, and physician office visits) among Medicaid enrollees.
- It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year (assuming those added were similar to the current enrollees), Medicaid will pay $2.1 million (in 2001 dollars) for heart disease care (plus the cost of prescription medication).

Stroke Hospitalization and Medical Care

Definition[38]: Stroke is a type of cardiovascular disease. It affects the arteries leading to and within the brain. A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot or bursts. When that happens, part of the brain cannot get the blood (and oxygen) it needs, so it starts to die.

Codes used to define stroke: ICD-9-CM codes 430-434, 436-438

Stroke Hospitalization Highlights

National Highlights

- Between 1979 and 2001, the number of Americans that were hospitalized in short-stay hospitals with (a primary diagnosis of) stroke increase 27 percent[8].
- 931 thousand hospitalizations due to stroke occurred in 2001[2].
- In recent years, a number of new and effective treatment mechanisms for stroke, such as using tPA to dissolve blood clots that are causing a stroke, have become much more commonly used[11].
- Direct health care costs resulting from stroke are expected to be around $33 billion in 2004[2].

Nebraska Hospitalization Highlights, 2001[5] *See pages 66-68 for detailed tables and figures.*

- At least 330 ER visits and 3,790 hospitalizations due to stroke occurred among Nebraska residents in Nebraska acute care hospitals.
- Stroke was the eighth leading cause of hospitalization, accounting for 2.1 percent of all hospitalizations.
- The 3,790 hospitalizations due to stroke occurred among 3,320 Nebraska residents, indicating that around 470 Nebraska residents were hospitalized multiple times for stroke.
- Estimated rates for hospitalization due to stroke remained virtually unchanged between 1996-2001.
- In 2001, Nebraska acute care hospitals charged payers an estimated $54.4 million for hospitalizations and $543 thousand for ER visits for health care services with stroke listed as the primary reason for care.
- Among all payers of hospitalization due to stroke in 2001, Medicare received the highest proportion of charges (75%) followed by commercial insurance (22%) and Medicaid (2%).
- The average charge per hospitalization due to stroke increased dramatically between 1996-2001, increasing from $8,940 to $14,330 per hospitalization for a 60 percent overall increase.
- About 1 in every 13 hospitalizations due to stroke (7.5%) resulted in death prior to discharge while an additional 1 in every 4 (26.7%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Nebraska Medicaid Highlights, 2001[10] *See pages 69-71 for detailed tables and figures.*

- 465 hospitalizations and 24,889 medical visits (including OP, ER, and physician office visits) due to stroke occurred among 11,160 of Nebraska's approximately 200,000 Medicaid enrollees
- The age-adjusted rate (per 10,000 population) for hospitalization due to stroke appears much higher among Medicaid enrollees (49/10,000) compared to all Nebraska residents (estimated at 21/10,000).
- Among Nebraska Medicaid enrollees, about 1 in every 15 hospitalizations due to stroke (6.5%) resulted in death prior to discharge, while close to 1 in every 3 (31.2%) resulted in discharge to an intermediate care, short-term care, or other type of facility for follow-up care.
- Medicaid paid $33.7 million for medical care due to stroke along with millions of additional dollars for stroke-related drug prescriptions.
- In 2001, stroke accounted for 3.7 percent of all medical encounter costs (including hospitalization, OP, ER, and physician office visits) among Medicaid enrollees.
- It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year (assuming those added were similar to the current enrollees), Medicaid will pay $1.7 million (in 2001 dollars) for stroke care (plus the cost of prescription medication).

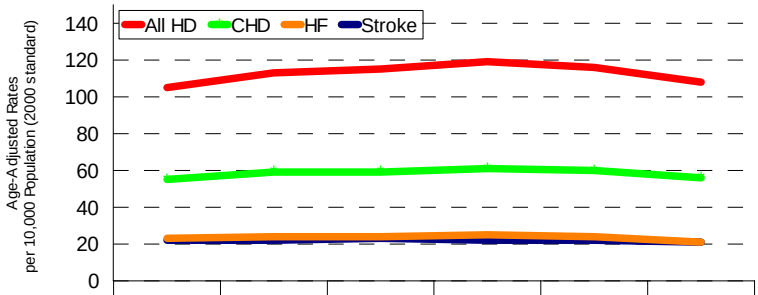
Medical Care due to Heart Disease and Stroke among all Nebraska Residents[5]

Table 7: Estimated Minimum Number of Hospitalizations, Hospitalization Rates, Length of Hospital Stay, and Hospitalization Outcomes for All Heart Disease, Coronary Heart Disease, and Stroke, Among Nebraska Residents, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]
Number of Hospitalizations	19,540	9,860	3,790
Hospitalization Rate (age-adjusted)*	108	56	21
Number of Residents that received (one or more) hospitalizations	15,330	8,020	3,320
Average Length of Stay per Hospitalization (in days)			
For all hospitalizations	4.1	3.8	5.4
For hospitalizations that patient died	5.5	5.0	4.7
For hospitalizations that patient was discharged alive	4.1	3.7	5.5
Hospitalization Outcome (%)			
Discharged home	69.0%	70.7%	47.6%
Discharged to other facility**	7.2%	4.5%	26.7%
Discharged to skilled nursing facility	19.9%	21.3%	18.1%
Died as patient	3.8%	3.3%	7.5%
Other outcome	0.2%	0.2%	0.1%

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
*Age-adjusted rate per 10,000 population (2000 U.S. standard population)
**Includes intermediate care, short-term care, or other type of facility for follow-up care
Note: these data are estimated because they range from 82-87% complete for any one year between 1996-2001
Source: Nebraska Hospital Discharge Data

Figure 17: Trends in Estimated Hospitalizations by All Heart Disease (HD), Coronary Heart Disease (CHD), Heart Failure (HF), and Stroke Among Nebraska Residents, 1996-2001



	1996	1997	1998	1999	2000	2001
All HD	105	113	115	119	116	108
CHD	55	59	59	61	60	56
HF	23	24	24	25	24	21
Stroke	22	22	23	22	22	21

*Primary discharge diagnosis using ICD-9-CM Codes: All HD 390-398, 402, 404, 410-429; CHD 410-414, 429.2; HF 428
Note: these data are estimates because they range from 75-80% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Table 8: Estimated Charges* (in millions) for Hospitalizations due to All Heart Disease, Coronary Heart Disease, and Stroke, Among Nebraska Residents, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]
Total Hospitalization Charges (in millions)	$397.9	$246.1	$54.4
Average Charge Per Hospitalization	$20,400	$25,000	$14,300
Per Hospitalization that patient died	$30,400	$36,000	$17,000
Per Hospitalization that patient was discharged alive	$20,000	$24,600	$14,100
Total Charges per Payer (in millions)			
Commercial Insurance	$145.3	$102.5	$15.3
Medicaid	$11.1	$6.2	$2.5
Medicare	$235.8	$133.3	$36.0
Other Federal Programs**	$2.6	$1.8	$0.23
Self Pay	$3.2	$2.4	$0.29

*Reflects that dollars charged for medical care and services, not the actual amount paid

**Includes federal programs other than Medicare and Medicaid

a. Includes charges for ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization

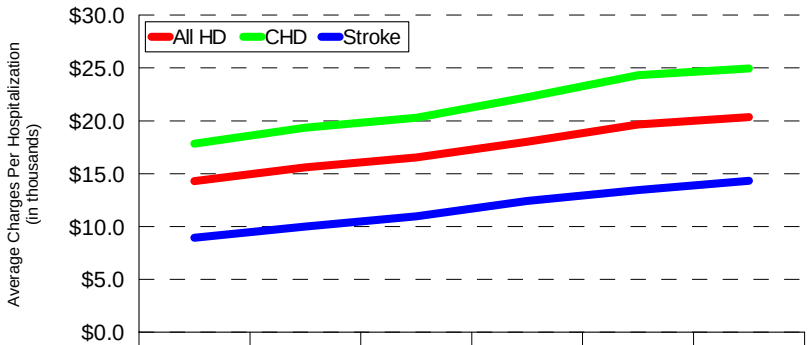
b. Includes charges for ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization

c. Includes charges for ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization

Note: these charges are estimated because they range from 82-87% complete for any one year between 1996-2001

Source: Nebraska Hospital Discharge Data

Figure 18: Trends in Estimated Charges (in thousands) for Hospitalizations due to All Heart Disease (HD), Coronary Heart Disease (CHD), and Heart Failure (HF), Among Nebraska Residents, 1996-2001



	1996	1997	1998	1999	2000	2001
All HD	$14.3	$15.6	$16.5	$18.0	$19.7	$20.4
CHD	$17.9	$19.4	$20.3	$22.2	$24.3	$25.0
Stroke	$8.9	$10.0	$11.0	$12.4	$13.5	$14.3

*Primary discharge diagnosis using ICD-9-CM Codes: All HD 390-398, 402, 404, 410-429; CHD 410-414, 429.2; HF 428
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Table 9: Estimated Minimum Number of Hospitalizations and Hospitalization Rate for All Heart Disease, Coronary Heart Disease, Heart Failure, and Stroke, Among Nebraska Residents by Age, Gender, and Urban/Rural, 2001

	All Heart Disease[a]		Coronary Heart Disease[b]		Heart Failure[c]		Stroke[d]	
	N*	Rate**	N*	Rate**	N*	Rate**	N*	Rate**
Overall	19,540	108	9,860	56	4030	21	3,790	21
Age								
≤ 24	90	1	5	0.1	10	0.2	30	0.4
25-44	760	16	340	7	60	1	90	2
45-64	5,000	132	3,280	89	520	14	630	17
65+	13,690	578	6,230	266	3430	141	3,040	127
Gender								
Female	8,990	85	3,790	37	2205	19	1,910	18
Male	10,550	135	6,070	78	1830	25	1,890	25
Urban/Rural^								
Urban Metro	6,950	97	3,520	49	1260	18	1,410	20
Urban Non-Metro	5,280	127	2,680	66	1100	25	940	22
Rural-Large	4,170	107	2,080	55	930	22	940	21
Rural-Small	3,120	106	1,570	56	740	22	600	20

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization

b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization

c. Includes ICD-9 code 428 listed as the primary cause of hospitalization

d. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization

*Estimated minimum number of hospitalizations for Nebraska residents treated in acute care hospitals in Nebraska

**Age-adjusted rate per 10,000 population

^Urban/Rural classifications can be found within the Methodology section of this report

Note: these data are estimated because they range from 82-87% complete for any one year between 1996-2001

Source: Nebraska Hospital Discharge Data

Medical Care due to Heart Disease, Stroke, and High Blood Pressure among Nebraska Medicaid Enrollees[10]

Table 10: Hospitalization and Total Medical Encounter Numbers, Rates, Length of Hospital Stay, and Hospitalization Outcomes for All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]	High Blood Pressure[d]
(Inpatient) Hospitalizations				
Number of Hospitalizations	2,208	947	465	166
Hospitalization Rate (age-adjusted)*	234	110	49	19
Number of Medicaid Enrollees that received (one or more) hospitalizations	1,658	740	399	154
Average Length of Stay per Hospitalization (in days)				
For all hospitalizations	4.6	4.2	6.7	5.8
For hospitalizations that patient died	4.8	3.5	7.9	6.0
For hospitalizations that patient was discharged alive	4.6	4.2	6.2	5.8
Hospitalization Outcome (%)				
Discharged home	59.1%	63.0%	38.7%	68.1%
Discharged to other facility**	22.9%	23.0%	31.2%	17.5%
Discharged to skilled nursing facility	11.2%	6.8%	22.8%	12.7%
Died as patient	5.8%	5.9%	6.5%	1.8%
Other outcome	1.1%	1.3%	0.9%	0.0%
Total Medical Encounters***				
Number of Medical Encounters	66,187	17,698	24,889	33,282
Medical Encounter Rate (age-adjusted)*	11,818	4,478	3,629	11,160
Number of Medicaid Enrollees that received (one or more) Medical Encounters	5,766	1,736	2,225	3,225

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
d. Includes ICD-9 codes 401-404 listed as the primary cause of hospitalization
*Age-adjusted rate per 10,000 population (2000 U.S. standard population)
**Includes intermediate care, short-term care, or other type of facility for follow-up care
***Includes hospitalizations, OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Table 11: Costs* for Hospitalizations and Total Medical Encounters due to All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]	High Blood Pressure[d]
(Inpatient) Hospitalizations				
Total Hospitalization Costs (in millions)	$7.9	$4.5	$2.4	$0.42
Average Cost Per Hospitalization	$3,599	$4,699	$5,255	$2,544
Total Medical Encounters*				
Total Medical Encounter Costs (in millions)	$41.1	$14.6	$33.7	$16.2
Average Cost Per Medical Encounter	$622	$824	$1,355	$486

*Reflects that actual dollars paid by Medicaid
a. Includes costs for ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes costs for ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes costs for ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
d. Includes costs for ICD-9 codes 401-404 listed as the primary cause of hospitalization
**Includes hospitalizations, OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Table 12: Number of Hospitalizations and Hospitalization Rate for All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees by Age, Gender, Race/Ethnicity, and Urban/Rural, 2001

	All Heart Disease[a]		Coronary Heart Disease[b]		Stroke[c]		High Blood Pressure[d]	
	N*	Rate**	N*	Rate**	N*	Rate**	N*	Rate**
Overall	2,208	234	947	110	465	49	166	19
Age								
≤ 24	24	2 +	2	0.1 +	8	0.6 +	6	0.4 +
25-44	154	55 +	71	25 +	35	12 +	38	14 +
45-64	723	563 +	373	290 +	145	113 +	54	42 +
65+	1,037	711 +	501	272 +	277	151 +	68	37 +
Gender								
Female	1,421	210	565	94	316	46	103	16
Male	787	282	382	143	149	54	63	24
Race/Ethnicity								
Asian	14	133 ++	11	111 ++	4	32 ++	3	25 ++
African American	161	203	63	83	43	55 ++	31	36 ++
Hispanic^	89	253	38	113 ++	21	57 ++	7	15 ++
Native American	61	318	23	125 ++	18	96 ++	7	32 ++
White	1,849	237	794	114	373	47	117	16
Urban/Rural^^								
Urban Metro	739	199	319	92	163	41	71	19
Urban Non-Metro	606	266	269	130	122	49	32	13
Rural-Large	444	248	187	120	92	62	37	23
Rural-Small	419	284	172	126	88	68	26	20

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes ICD-9 code 428 listed as the primary cause of hospitalization
d. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
*Number of hospitalizations for Nebraska Medicaid Enrollees
**Age-adjusted rate per 10,000 Nebraska Medicaid Enrollees
+Age-specific rate per 10,000 Nebraska Medicaid Enrollees
++Rates based on fewer than 50 cases should be viewed with caution
^Hispanic can be of any race
^^Urban/Rural classifications can be found within the Methodology section of this report
Source: Nebraska Medicaid Claims Data

Table 13: Number of Medical Encounters[#] and Medical Encounter Rate for All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees by Age, Gender, Race/Ethnicity, and Urban/Rural, 2001

	All Heart Disease[a]		Coronary Heart Disease[b]		Stroke[c]		High Blood Pressure[d]	
	N*	Rate**	N*	Rate**	N*	Rate**	N*	Rate**
Overall	66,187	5766	17,698	1736	24,889	2,225	33,282	3225
Age								
≤ 24	2,111	157 [+]	114	9 [+]	465	35 [+]	728	54.1 [+]
25-44	4,077	1445 [+]	930	330 [+]	1,531	543 [+]	4,065	1441 [+]
45-64	14,694	11439 [+]	5,065	3943 [+]	5,011	3,901 [+]	8,563	6666 [+]
65+	45,305	24628 [+]	11,589	6300 [+]	17,882	9,721 [+]	19,926	10832 [+]
Gender								
Female	45,535	5304	11,251	1479	16,686	2,044	24,399	3301
Male	20,652	6685	6,447	2240	8,203	2,651	8,883	3053
Race/Ethnicity								
Asian	325	2609	123	1191	234	1,417	400	2861
African American	4,828	5666	1,133	1459	2,892	3,391	5,147	5937
Hispanic^	1,665	4085	493	1360	406	1,070	1,021	2262
Native American	762	3770	200	1051	437	2,303	545	2649
White	57,954	5985	15,486	1813	20,622	2,159	25,696	2920
Urban/Rural^^								
Urban Metro	21,103	5196	6,223	1660	10,046	2,439	14,050	3626
Urban Non-Metro	17,735	5980	4,009	1523	5,951	2,053	7,915	2950
Rural-Large	13,139	5773	3,805	1955	4,433	2,038	5,506	2742
Rural-Small	13,757	6985	3,560	2082	4,272	2,204	5,572	3092

[#]Includes hospitalizations, OP, ER, and physician office visits

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause

b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause

c. Includes ICD-9 code 428 listed as the primary cause

d. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause

*Number of hospitalizations for Nebraska Medicaid Enrollees

**Age-adjusted rate per 10,000 Nebraska Medicaid Enrollees

[+]Age-specific rate per 10,000 Nebraska Medicaid Enrollees

^Hispanic can be of any race

^^Urban/Rural classifications can be found within the Methodology section of this report

Source: Nebraska Medicaid Claims Data

Emergency Medical Services Response Times due to CVD among Nebraska Residents

Number of EMS Transports due to Cardiac Events, 2000[12]

Cardiovascular disease is a major contributor of emergency medical services (EMS) in Nebraska. In 2000, (at least) 5,584 EMS transports occurred among people in Nebraska for suspected cardiac events (including chest pain, myocardial infarction, and cardiac arrest).

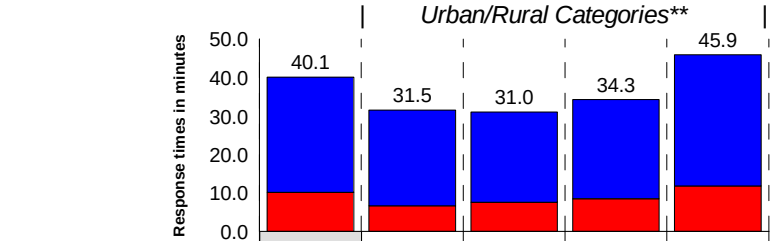
Of the 5,584 (reported) EMS transports for cardiac events that occurred during 2000, slightly more than half occurred among males. Males accounted for 2,993 EMS transports for cardiac events in 2000 (or 53.6% of the total) while females accounted for 2,591 (or 46.4% of the total).

Average Response Times for Cardiac Events, 2000[12]

In 2000, the average EMS response time for a suspected cardiac event in Nebraska was: 10:10 from dispatch to the scene (or individual in need) and 29:55 from the scene to the health care facility (Figure 17). This indicates that the average Nebraska resident in need of EMS for a suspected cardiac event can expect arrival at a health care facility approximately 40 minutes after the EMS unit is dispatched.

It only takes 4 minutes for the body to sustain brain damage without oxygen. Thus, it is most critical that dispatch to scene times are kept as short as possible. The current dispatch to scene time of 10:10 for cardiac events in Nebraska indicates that many residents likely receive permanent damage or death that could be prevented if faster medical care were available.

Figure 17: EMS Response Times (in minutes) for Cardiac Events* from Dispatch to Arrival at the Health Care Facility Among Nebraska Residents by Urban/Rural, 2000



	Overall Nebraska	Urban Metro	Urban Non-Metro	Rural-Large	Rural-Small
Number of Transports^	5,584	2,107	1,520	1,053	904
Scene to Hospital (minutes)	29.9	24.8	23.4	25.8	34.0
Dispatch to Scene (minutes)	10.2	6.7	7.6	8.5	11.9

*Includes the average response times (for the times reported) for suspected cardiac events including chest pain, myocardial infactrion, and cardiac arrest
**See methodology for further detail on urban/rural classifications
^This is the minumum number of known transports for suspected cardiac events (some may go unreported)
Source: Nebraska EMS Data

Due, in part, to the low population density within many regions of Nebraska, EMS response times for cardiac events differ by place of residence. Nebraska residents of rural-small counties receive longer dispatch to scene (11:52) and scene to health care facility (33:59) times than residents of urban metro (6:39,24:50), non-urban metro (7:35,23:26), and rural-large counties (8:30,25:46). In 2000, EMS dispatch to scene times for cardiac events were, on average, at least 3 minutes and 22 seconds longer in rural-small counties compared to the other three urban/rural regions.

In addition to varying EMS response times across Nebraska, the quality of 9-1-1 telephone coverage differs dramatically by place of residence. This indicates that residents within rural-small Nebraska counties are not only at greater risk from longer transport times, but also may experience complications that delay EMS dispatch.